

# Chapter 7 – Turf Management



Turf provides a forgiving and resilient surface for many recreational activities and is the traditional "green carpet" visitors associate with parks. Because turf varies substantially in use, so do turf management practices. Appropriate management ensures high quality turf where it is needed, such as on athletic fields and golf courses, and that the designed use of a site is met. The best management practices described in this chapter for turf management would also be applicable for city streetscapes with turf as a component of the landscape.

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## 7.2 Definitions

**Turf** – Any lawn or grasses grown in developed parks, streetscapes or public facilities. Turf areas vary widely in type of use from highly maintained athletic fields and golf courses to rough mow areas.

**Synthetic Turf** – Artificial grass, or synthetic turf, is a man-made product manufactured to look like natural grass. Artificial grass is a carpet-like material used for a variety of indoor and outdoor surfaces, and is made of recycled or synthetic material.

**Mulching** – Grass clippings left after mowing, that provide nutrients and organic matter to the soils.

**Trimming** – Mowing and grass removal in areas that cannot be accessed by large riding mowers.

**Edging** – Grass removal along the edges of turf areas.

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## 7.3 Background

The park system offers visitors a wide variety of turf, including lawns (both formal and informal), athletic fields, golf courses and meadows. Each type of turf requires a separate best management practice. The intensity of management ranges from very highly maintained golf course turf to meadow areas that may get mowed only once a year as a fire prevention measure.

### Construction Issues

- Turf areas should be constructed with a minimum slope of 2% to promote surface drainage and a maximum of 15% to allow riding mowers to safely access the areas.
- Whenever possible, the existing soil should be amended with sand and a minimum of 6" of topsoil to provide a drier surface area. Dry areas allow easier and earlier (in the mowing season) maintenance.
- Trees, signposts, benches and other park amenities should be carefully placed in turf areas to reduce the need for hand trimming. If possible, these amenities should have the turf immediately surrounding them removed (such as for a tree ring) to protect the amenity and to facilitate more efficient turf care.
- Whenever possible, seeding should occur during the spring or fall months to insure maximum germination.
- Design a natural buffer area (no pesticide or fertilizer use) between turf and water bodies or drainage systems. If possible, buffer should be 50 feet.

### Plant Selection

Selection of grass species is based on site conditions, expected usage and maintenance standards. Sites with optimum growing conditions and high maintenance standards are seeded with blends of several species of perennial rye grass. Sites with poor drainage, partial shade and limited fertilizer applications require blends of perennial rye grass and red fescues.

## 7.4 Best Management Practices

The following BMPs apply to all City of Bellevue turf plantings. Some

variations may apply to golf course turf.

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## Mowing

- **Frequency:** The importance of regular mowing for promoting healthy turf cannot be over emphasized. Growth should be monitored and frequency increased to avoid removing more than 1/3 of the leaf blade. The following is the basic standard for mowing frequency:

Season	Frequency
March - October	Weekly
February & November	Monthly or as needed
December	As needed

- **Cutting Height:** Mowing height should be 2 to 2.5 inches to promote healthier turf. Lower cutting height often results in scalping spots where the ground is uneven.
- **Mulch Mowing:** Grass clippings should rarely be removed from mowed turf areas. The plant nutrients and organic material they contain play an important role in developing a healthy, productive environment for root growth.
  - Mowing patterns should be alternated to avoid ruts and compaction from the wheels.
  - Avoid driving on frozen turf.
  - Avoid driving on wet ground where ruts will remain. Walk the site during wet conditions to do a visual inspection.
  - Mowing equipment must be maintained regularly, especially sharpening and adjusting of cutting edges.
  - Ensure that grass clippings do not have the potential to be washed into stream or drainage systems, which can degrade water quality.

## Trimming

- Trimming shall be performed by walk behind mowers and line trimmers in areas that cannot be accessed by riding mowers.
- Trimming should be coordinated to coincide with other mowing activities on the site.

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### Edging

- Edging shall be performed a minimum of 2 to 4 times per year, depending on the maintenance standard for the site. Turf edging is done to give a finished look to lawn areas that border paved surfaces or planting areas.
- At high visibility locations, edging shall be performed at a higher level of frequency.
- Edging should be performed with metal bladed equipment whenever possible to prevent damaging turf edges.

### Irrigation

- Automatic irrigation effectiveness shall be monitored on a weekly basis or more for sand based fields.
- Approximately **1 inch** of water, including rainwater, shall be applied per week. During spring rainy seasons, irrigation techniques should be modified to fit the weather, as well as in the summer drought months. Theoretically, the irrigation cycle should be extended to the point just before drought stress occurs. This period varies with soil conditions, weather, site usage and maintenance practices.
- Irrigation should be scheduled to promote deep root growth.

### Fertilization

- In general, fertilizer blends containing phosphorus (P) are prohibited. The only exception may be when establishing newly seeded turf.
- Fertilizer shall be a slow release compound of Nitrogen (N), Iron (Fe) and Potassium (K). The ratio is dependent upon the time of year.
- Fertilized turf shall be pH soil tested as necessary to insure it is at the level most optimal for nutrient absorption.
- Each application should not exceed 1 lb. of N per 1000 square feet.
- Applications during heavy rainfall shall be avoided to prevent runoff.
- Applications in very hot weather shall be avoided.
- Irrigation should be operational before growing season applications.
- Sprinkler heads should be marked to avoid damaging them during tractor applications.

- Excess fertilizer shall be removed from hard surfaces immediately.
- Micronutrients and lime should be added, as soil tests indicate.
- Site-specific fertilizer restrictions must be observed. Site-specific cautions include not using any fertilizer on turf areas adjacent to streams and wetlands and prohibiting applications within 25 ft of lakes and waterways.

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## Aeration

- Aeration shall be done 2 to 3 times per year, or as needed, using .75-inch hollow or solid tines.
  - Best periods: March/April, late June, and late August.
  - Technique: Make at least 2 passes at 90-degree angles.
- Areas with drainage problems should be deep-tine aerified 1-2 times per year using 1-inch-by-6-inch hollow or solid tines.

## Top Dressing

General-use top dressing mix shall be used, and should be primarily sand with minimum organic matter.

- Frequency: most effective when done lightly and frequently.
- Each application should be about ¼ inch.

## Over-seeding

- Heavily impacted areas should be over-seeded at least once per year.
  - Best practice is to over-seed in fall and slice seed in spring.
  - Over-seed rate is approximately 5 lb./1000 sq. ft.
- The following site characteristics, usage and maintenance practices shall guide seed selection:
  - Ideal sites with full sun, good drainage and reasonable fertility are suited for perennial ryegrass blends.
  - Lawns that are in partial shade or poorly drained should be seeded with mixes of perennial rye and fescues.
  - Remove leaves and debris on turf prior to over-seeding.

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- Keep leaves and debris off turf as much as possible after over-seeding to promote successful germination of grass seed.

### Site Standards

Site standards for turf vary by landscape classification. Landscape classifications include prominent, general and non-irrigated lawn areas, steep slopes, meadows, soil or sand based athletic fields, synthetic athletic fields and bathing beaches.

#### Prominent Irrigated Lawn Areas

These are high-visibility or high-use landscapes. Some examples are community center lawns, popular picnic or sunbathing areas, lawns adjacent to busy arterials, beach parks, City buildings, community parks and the Bellevue Botanical Garden or smaller neighborhood parks where the lawn is the most significant amenity. Maintenance of these areas should be comparable to an athletic field with additional emphasis on trimming and edging.

- Fertilization: Soil shall be pH tested to determine fertilization requirements. Based on pH test results, 3 to 4 applications per year of fertilizer mix shall be applied.
- Aeration: Should occur 2 to 3 times per year with conventional 0.75-inch hollow tines.
- Over-seeding: The entire lawn at least once per year at 5 lb. per 1000 sq. ft. Monthly applications should occur in heavy wear areas.

#### General Irrigated Lawn Areas

These are lawn areas in parks of various types where irrigation is available.

- Fertilization: Apply N-K ratio at 1 to 2 lb. N per year, per 1000 sq.ft., in 1 to 2 applications. Preferable fall N-K ratio is 15-0-31 with 6% iron and preferred spring N-K ratio is 22-0-22 with 6% iron.
- Aeration: Should occur 1 to 2 times per year with conventional 0.75-inch hollow tines.
- Over-seed: To be implemented as needed. Best done April/May and October.

**Non-Irrigated Lawn Areas:**

These are lawn areas in parks of various types where irrigation is not available.

- Fertilization: N-K should be applied once in October.
- Over-seeding: As needed. Best done in October.

**Steep Slopes**

Mowing and maintaining turf on steep slopes can be hazardous. Whenever possible, low growing shrubs or ground covers should be planted on steep slopes. This will greatly reduce maintenance needs and increase erosion control. If turf is ever required on a steep slope, the following management practices should be followed:

- Grass growth should be controlled mechanically with string trimmers.
- Turf growth regulators should be sprayed to extend trimming cycle.
- Consider leaving un-mown or mowing only 1 or 2 times per year.
- Consider replacement of existing turf with low growing shrubs or groundcovers.

**Meadows**

Meadows are unique environments that function primarily as wildlife habitat.

- Mowing should be infrequent with the goal being brush suppression and fire control. Analyze site for potential fire threat and fire control strategies.
- Successful establishment of native species requires that they have the opportunity to set and release seed before mowing.
- Site access routes should consider maintenance, interpretive value and habitat preservation.
- Species selection should be matched with existing available groundwater.
- Location of meadow should attempt to link other wildlife areas into larger contiguous habitat areas.
- Scheduling and timing should minimize impacts to wildlife nesting and habitation.
- One mowing every 2 to 3 years may be sufficient for woody brush control. Firebreak areas may require more frequent

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mowing to maintain. Mowing heights should be 3 to 5 inches.

### Soil-Based Athletic Fields

These athletic fields are generally composed of native soil formed on-site with minimal amendment. These facilities are characterized by scheduled play. Drop-in fields are maintained as general irrigated lawn unless there is exceptionally high usage.

- Soil: Soil shall be pH tested every 2-4 years. Add lime as needed to ensure optimum nutrient intake.
- Fertilization: N-K shall be applied at a ratio at 2 to 6 lb. of N per year in 3 to 4 applications.
- Aeration: Should occur 4 times per year with conventional 0.75-inch hollow tines. Field should be deep-tine aerified every 1 to 2 years.
- Over-seeding: The entire field at least once per year at 5 lb./1000 sq. ft. or about 375 lb. per soccer field. Monthly applications should occur in heavy wear areas, such as the goalmouth, during the playing season.

### Sand-Based Athletic Fields

These fields are entirely composed of imported sand and are known for their outstanding drainage capability.

- Irrigation: Shall be done more frequently than on soil fields.
- Fertilization: Apply N-K ratio at 3 to 6 lb. of N per year in 6 to 8 applications, depending on turf type and time of year.
- Aeration: Should occur 2 to 3 times per year with conventional 0.75-inch hollow tines. Deep-tine aerating (6"+) every 2 to 3 years should also be done.
- Over-seeding: The entire field or ballfield at least once per year at 5 lb./1000 sq. ft. or about 375 lb. per soccer field. Monthly applications should occur in heavy wear areas, such as goalmouths, during playing season.

### Bathing Beaches

- Fertilization: Apply 2 to 6 lb. of N per year in 2 to 3 applications of a slow-release product.
- Special care should be taken to not fertilize in advance of heavy rains or before expected heavy park use periods.
- Aeration: Should occur 2 to 3 times per year with conventional 0.75-inch hollow tines.



- Over-seeding: The entire lawn at least once per year at 5 lb./1000 sq. foot. Monthly applications should occur in heavy wear areas.

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### Synthetic Turf Athletic Fields

Maintaining a synthetic turf field is essential for optimum appearance, safety, performance and field longevity. Maintenance of a synthetic field typically consists of cleaning, stain removal, minor seam repair, grooming, redistribution of infill material and management of infill compaction. A regular maintenance schedule should include:

- Debris removal: Daily
- Aggressive surface cleaning: Biannually
- Grooming: Monthly
- Infill replenishment/redistribution: Weekly for high traffic areas on synthetic baseball infields, monthly for all other sports.
- De-compaction: Monthly

The synthetic turf manufacturer/installer should provide detailed written maintenance instructions, suggested warranty guidelines and training of maintenance personnel.

## 7.5 Integrated Pest Management

### Pest Tolerance Thresholds

- Weed, insect and disease pests are typically tolerated in general park lawn areas.
- Turf pests in highly maintained turf such as athletic fields, bathing beaches and other high-visibility/high-use areas are generally controlled through good turf cultural practices.
- Pesticides can be applied to park turf areas only when thresholds for weeds, especially in high profile areas, become unacceptable.
- Because of the unique conditions present on golf courses, a variety of pest control measures are used, including mechanical, cultural and chemical.

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## **Pest Management Strategies**

### **Weed Control**

As discussed, weeds in turf are generally tolerated with the exception of those in golf course turf and a high-visibility park turf areas. When control is necessary, the primary method is through the following cultural practices.

- Careful monitoring of watering practices
- Fertilization
- Aeration
- Top-dressing
- Over-seeding

By performing this preventive maintenance, park turf is healthier and better able to compete with various broadleaf weeds. Chemical weed control may be used for controlling particularly difficult weeds in high-visibility turf areas.

- In these rare situations, the least toxic, least residual pesticide will be used. Pesticide use should be avoided near waterways.
- In general, broadcast applications will be avoided.
- The timing of such applications will be made to avoid contact with the public to the extent possible.
- Posting of the site that has been treated will be done as legally required to meet or exceed legal requirements.
- Maintenance of City golf courses includes treatment of broadleaf weeds through cultural practices and spot application of carefully selected herbicides.

### **Wood Brush Control**

Woody brush control in meadows may require the use of chemical controls if mechanical control measures are not adequate.

### **Insect Control**

The only insect pest of significance for turf in Bellevue is the European crane fly. While it can be quite damaging to turf areas, the crane fly is not generally treated by prophylactic control in Bellevue parks.

- Chemical control is used only in the rarest of circumstances on turf of high visibility and value such as golf course turf and selected high-visibility/high-use park turf areas.
- Any chemical applications will be spot treatments directed specifically at the turf areas containing the pest.

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### Disease Control

- **General Park Turf:** Disease in general park turf is generally tolerated and is not actively controlled. In high-use/high-visibility park turf areas, disease will be controlled to a considerable degree by sound cultural practices. Pesticides may be used if the disease is not controllable through cultural practices.
- **Golf Course Turf:** Because turf disease can be a problem on golf courses, it must be controlled to preserve the function of this asset. Golf course turf, particularly greens and tees, must perform under extreme conditions of maintenance and use. The condition of the turf affects playability and aesthetics of a golf course. These conditions make golf course turf more susceptible to disease than other park turf. The following IPM practices are used to maintain healthy golf course turf:
  - Disease is tolerated on fairways and rough areas, and is not tolerated on greens or tees.
  - Certain diseases are controlled through the application of an appropriate fungicide.
  - When used, fungicides are applied to the diseased turf only.
  - The least toxic products are used.
  - The type of fungicide used will be changed from year to year to reduce the chance of the turf disease developing a resistance to the chemical control.

### Grass Trimming Abatement

Controlling grass along fence lines, around trees and other landscape features helps preserve the asset by allowing large riding lawn mowers to steer clear of objects. This routine maintenance activity is especially important around trees where mower damage can easily lead to tree loss. An additional advantage of grass trimming abatement is that it makes parks appear clean and well kept. This image, in turn, has a

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positive impact on how the public uses our facilities. Well-maintained parks experience less vandalism and misuse. Grass trimming is accomplished in the following ways:

- **String trimmers or Push Mowers:** Grass is trimmed using gas-powered string trimmers or push-type lawn mowers. This practice is very labor intensive, costly, and produces noise and air pollution.
- **Herbicide:** This work is often performed through the annual (or less frequent) application of non-selective post emergent herbicides, such as Roundup. These products are sometimes used in conjunction with pre-emergent herbicides to provide ongoing control of weed and grass seed not yet germinated in tree rings and similar areas.
- **Concrete Mow Strips:** As resources are available, it is sometimes possible to provide a “mow strip” of concrete or a similar low maintenance product around some landscape features to eliminate the need for grass trimming. This control option is costly and doesn’t work in all situations.

### 7.6 Training

- All park maintenance field staff should have training in basic turf management.
- The City mower operators have specific training regarding mowing heights and patterns.

